PATENT SPECIFICATION

420,628

Convention Date (United States): July 19, 1933.

Application Date (in United Kingdom): Jan. 1, 1934. No. 48/34.

Complete Accepted: Dec. 5, 1934.

COMPLETE SPECIFICATION.

Improvements in and relating to the Manufacture of Lined Crown Corks.

I, JOHN AARON JOHNSON, a citizen of the United States of America, and residing at 8416-86th Street, Woodhaven, New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to assembling sealing pads of comminuted or solid cork or other suitable yielding material in receptacle closure caps of the type known as " crown caps " and facings or spots of suitable non-absorbent, gas impervious and acid resistant material, such as metallic foil or paper having a coating of varnish on one surface, on the sealing pads in the closure caps in a continuous series of operations.

It has heretofore been the practice to assemble and adhesively secure the sealing pads in the closure caps in one apparatus by supplying an adhesive to the caps, passing the caps with the adhesive therein through a zone having an elevated temperature to render the adhesive viscous, delivering and positioning the sealing pads in the caps in contact with the adhesive, and then placing the sealing pads in the caps under pressure during the cooling of the caps and when the caps are cooled they are stored away to be used for closing and sealing receptacles with only the sealing pad assembled therein. Should the contents of the receptacles to be sealed by the closure caps be composed of substances that will decompose or deteriorate the cork, and thereby render the same useless as a seal, a lining facing spot, usually of less diameter than the sealing pad, is applied to the sealing pads and comprising a non-absorbent, gas impervious and acid resistant material, such as metallic foil or paper having a coating of varnish on one surface, having an adhesive combined therewith on one surface, the adhesive having the characteristic of being normally non-tacky or non-viscous, but adapted to be rendered tacky or viscous by an elevated temperature so that the spot may be adhesively secured to the portion of the sealing pad that will be exposed to the deteriorating action of the contents of the receptacle to be sealed by the closure cap. The facing spot is applied to the sealing pad by a method and apparatus separate and distinct from that of assembling the sealing pads in the closure caps, comprising cutting a disc or spot from the web of combined lining material and adhesive, and assembling the spot as it is cut from the web on the cap pad with the adhesive surface in contact with the pad, the pad being heated preferably prior to the assembling of the spot thereon as by passing the closure cap with the pad assembled therein through a zone having an elevated temperature to heat the exposed surface of the pad, then subjecting the spot to heat and pressure and finally subjecting the sealing pad with the lining spot assembled thereon to pressure during the cooling of said spot and pad.

It is the principal object of the present invention to provide a new method of assembling sealing pads in receptacle closure caps and lining spots on the pads in a continuous series of operations and the providing of a single machine for assembling sealing pads in crown closure caps and lining spots on the sealing pads thereby eliminating a duplication of operations and greatly facilitating the assembling and increasing the number of closure caps assembled within a given period of time and effecting a saving in the cost of the production or assembling of the caps.

The present invention consists in assembling sealing pads in closure caps and discs of facing material on the sealing pads, consisting in providing a closure cap having an adhesive therein, and in successive sequence heating the cap to render the adhesive tacky, depositing a sealing pad on the adhesive in the cap, subjecting the pad in the cap to heat and pressure to effect an intimate adhesion between the pad and cap and heat the exposed surface of the pad in the cap, place a facing disc of a non-absorbent, gas impervious and acid resisting material having an adhesive on one surface non-viscous at normal temperature and

[*Price* 1/-]

Price 4s 6d

adapted to be rendered viscous when subjected to an elevated temperature on the heated sealing pad with the adhesive surface in contact therewith, the heat of the pad rendering the adhesive viscous and causing adhesion of the facing disc to the pad, and then placing the disc of facing material on the pad and the pad in the cap under pressure to intimately unite the facing disc to the pad and the pad to the cap.

Another object of the invention is to provide improved heat pressure applying means whereby the sealing pads and lining spots are more uniformly and securely assembled in the closure caps than has heretofore been possible.

The embodiment of the invention comprises means to support and feed closure caps relative to means or devices to supply the caps with an adhesive, said adhesive in the caps being rendered viscous by passing the caps through a zone having an elevated temperature before the caps are positioned relative to means to deliver and position sealing pads in the caps in contact with the adhesive, and after the sealing pads are positioned in the caps, the caps by the feeding thereof are positioned relative to means to heat and place the pads under pressure to adhere the pads to the caps and heat the exposed surface thereof, the caps then being positioned relative to means to cut a lining spot from a web of combined lining material and adhesive and assembling the linings as they are cut from the web on and with the adhesive in contact with the heated pads to render the adhesive viscous or tacky and effect adhesion of the lining spots to the heated pads, the caps with lining spots on the pads then being positioned relative to means to intimately adhere the lining spots to the sealing pads under pressure and heat, and then positioning the caps having the sealing pads with lining spots therein relative to means to apply pressure to the sealing pads and lining spots during the cooling period to assure permanent adhesion of the sealing pads to the caps and lining spots to the sealing pads.

In the drawings accompanying and forming a part of this application Figure 1 is a view looking at the top of one end portion of the apparatus for carrying out the invention showing means for delivering caps to the cap supporting and feeding means, the adhesive supplying means, and means to produce an elevated temperature for rendering viscous the adhesive.

Figure 2 is a view looking at the top of the end portion of the apparatus opposite to that shown in Figure 1, and showing means to deliver and position sealing pads in the closure caps, the means to heat the pads, the means to cut a lining spot from a web of lining material and adhesive and position the cut spots on and with the adhesive in contact with the heated pads, the means to place the lining spots under heat and pressure, the means to apply pressure during the cooling of the caps and driving means of the apparatus.

Figure 2a is a fragmentary view of a plunger of the means for applying pressure during the cooling of the caps.

Figure 3 is a cross sectional view taken substantially on the line 3—3 of Figure 1 looking in the direction of the arrows and showing the adhesive applying means.

Figure 4 is a cross sectional view taken substantially on the line 4—4 of Figure 2 looking in the direction of the arrows and showing the means for delivering and positioning sealing pads in the closure caps.

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 2 looking in the direction of the arrows and showing punch and die mechanism to cut a lining spot from a web and position the cut lining spot on a pad and means to feed a web of an adhesively surfaced lining material to the punch and die.

Figures 6 and 7 are sectional views of the punch and die mechanism showing respectively the punch and die in inoperative position and in position of assembling a cut lining spot on a sealing pad in a cap, and also showing the movement of the punch and die relative to each other.

Figure 8 is an elevational view of heated plungers and the mounting thereof to heat the sealing pads and place the pads with lining spots under heat and pressure and punch and die mechanism, and showing in section one of the plungers to show a heating element therein as well as the means to actuate the plungers and punch and die; and

Figure 9 is an elevational view of a heated plunger showing in section the upper portion that is broken away in Figure 8, and showing the plunger in position to apply heat and pressure to a cap.

In the embodiment of the invention illustrated in the drawings the operative parts are mounted on a suitable framework comprising a table T supported upon standards S.

Caps C of the crown type comprising a metal disk having a corrugated skirt with the marginal portion flared outwardly without sealing pads or liners therein, are

delivered by a chute or slide *a* leading from a hopper (not shown) to a guide member 10 of tunnel shape in cross section supported by the table T, as at 11, relative to the peripheral portion of a disk 12 carried by a shaft 13 rotatably supported in the table and driven from a drive shaft 14 through a pinion connection, as shown in dotted lines at 15 in Figure 1, the shaft 14 being journalled in hangers 16 suspended from the undersurface of the table to extend the full length of the table and driven from a suitable source of power, such as an electric motor, not shown, by a belt adapted to pass around and be shifted from a pulley 17 loose on the shaft 14 to a pulley 18 fixed on said shaft to place the apparatus into operation, and shifting the belt from the fixed pulley to the loose pulley stopping the apparatus. The continuous rotation of the disk 12 moves the caps in the guide member 10 and positions the leading cap in engagement with an abutment 19 extending transversely of the peripheral portion of the disk and formed by extending an end of a rail 20 of a pair of spaced rails 20, 21 mounted above and parallelly of the table T in a plane substantially even with the upper surface of the disk, the caps being supported at opposite marginal portions by and to be fed along the rails. The leading cap is positioned by the abutment 19 in alignment with the space between the rails 20, 21, so that the leading cap may readily be transferred from the disk 12 onto the rails. Rail 21 is fixedly supported from the table T by posts, as indicated in dotted lines at 22 in Figures 1 and 2, and rail 20 is mounted on the table to have adjustment toward and away from rail 21 to vary the space between the rails for the supporting of different size caps by supports 23 fixed to the table and having the upper portion of angular formation and projecting in a direction toward the rail 21 for the slidable engagement of U brackets 24 fixed to the rail 20 and retained in adjusted position by a screw 25. The adjustment of the rail 20 will also adjust the abutment 19 to properly position the leading cap relative to the space between the rails. The opposed edges of the rails 20, 21 are bevelled, as at 26, to engage the flaring marginal portion of the skirt of the closure caps C and prevent the scratching or marring of the decorative surface of the caps. The rail 21 is secured to the posts 22 by screws and the vibration of the apparatus during the operation tending to wear the rail about the screw openings, and to cause the rail 21 to move laterally away from the rail 20, thus varying the space between the rails so that the rails will not properly support the caps thereon, is prevented by providing adjustable abutments in the form of set screws 44 threaded in posts 45 mounted on the table T, and these screws are maintained in abutting relation with the edge of the rail opposite to the bevelled edge 26 by a lock nut 46.

The caps C are intermittently advanced or fed along the bevelled edges 26 of the rails by a feed rack embodying a plate 27 carried by a slide 28 slidably supported in a recessed portion 29 in the rail supports 23, as clearly shown in Figure 3, to have longitudinal and lateral movements. The plate is arranged along one longitudinal edge with laterally extending fingers or projections forming spaced arcuate recesses 30 substantially of the same size and shape as the caps, to engage the caps laterally and feed them along the rails 20, 21 by a reciprocatory movement thereof consisting of four separate quadrant stages produced through the rotation of a pair of spaced disks 31 rotatably mounted on the table T at the opposite ends of the plate 27 and actuated from the drive shaft 14 through gears 32, as shown in dotted lines in Figures 1, 2 and 3. The feed rack is pivotally connected to the disks 31 eccentrically of the axis of the disks by arms 33 extended laterally from slide 28 adjacent the opposite ends. By the rotation of the disks, movement is imparted to the rack laterally to engage the rack fingers between and into engagement with the caps on the rails 20, 21, then in a direction longitudinally of said rails to feed the caps along the rails, then laterally to move the rack fingers out of engagement with the caps, and then longitudinally in reverse direction to position the rack fingers between successive caps on the rails 20, 21.

The caps C are moved by the disk 12 from the guide 10 relative to a tunnel shaped guide member 34, Figure 1 hingedly carried by the table T, as at 35, in alignment with the delivery end of the guide 10 to extend over the disk at the entrance to the space between the cap supporting rails 20, 21 and to permit lifting of said guide member away from the disk 12 to remove caps which may become jammed, and for inspection, cleaning or other purposes.

The leading cap engaging the abutment 19 is moved forward onto the bevelled edges 26 of the rails 20, 21 by an ejector member 36 pivotally mounted on a supporting stud 37 on the table T, to extend over disk 12 and have oscillatory movement between said disk and guide member 34 and the abutment 19 to engage

said leading cap by a projection extended laterally from the free end, the free end being in an arc, as at 38, to engage the successive caps and maintain the caps in their respective positions in the guide members 10, 34, during the delivery of the leading cap onto the rails 20, 21. The ejector 36 is actuated by and in sequence with the movements of the feed rack through a link 39 pivotally connected at one end with the feed rack plate 27 and connected at the opposite end to the ejector member adjacent the mounting thereof by a pin 40 fixed in and extending laterally from the ejector engaging a slot 41 in the link and yieldingly urged against one end of said slot by a leaf spring 42 anchored on the ejector support 37 and slidably engaging the pin 40 to permit the pin to move along the slot to the opposite end thereof against the tension of spring 42 with the ejector remaining in its rearward position shown in dotted lines in Figure 1, should the caps on the rails 20, 21, for any reason be not advanced and the space on the rails to be taken by the leading cap engaging the abutment 19 be already occupied by another cap. The longitudinal movement of the feed rack in a direction away from the disk 12 and the corresponding forward movement of the ejector 36 effected by the spring 42 will transfer the cap engaging the abutment 19 onto the rails 20, 21 into engagement with the end feeding finger of the rack plate 27, as shown in Figure 1. During the next two quadrant steps of the movement of the rack plate, the ejector 36 will be moved away from the guide 34 through the link connection thereof with the rack plate permitting the successive caps in the guide 10 to be moved by the rotation of the disk 12 to position the foremost or leading cap against the abutment 19 opposite the ejector projection, the first recess 30 at the end of the rack adjacent the disk 12 being positioned opposite the cap positioned by the ejector on the rails 20, 21 and upon the successive movement of the feed rack towards the caps on the rails positioning the end feed finger in the rear of such end cap on the cap supporting rails and moving the rack fingers that were in front of the caps to the rear of the respective caps on the rails. During the next step in the movement of the feed rack the caps on the rails are moved forward a distance equal to the width of the rack recesses, the caps in the forward recess being delivered from the rails and the foremost cap in guide 34 transferred to the rails 20, 21 by the ejector 36 in engagement with the first slide finger as described.

To retain the caps on the rails 20, 21, guide rails 43 are superposed in spaced relation to the rails 20, 21, as clearly disclosed in Figures 3, 5, 6 and 7, with the marginal portion overhanging the bevelled cap supporting edges 26 of the rails.

The caps are intermittently fed by the quadrant movements of the feed rack after they are delivered from the disk 12 to a device or means to supply an adhesive to the caps, in the present instance comprising a receptacle or reservoir 47 for the adhesive in a fluid state having a tubular portion 48 extending from the bottom thereof loosely engaged in a projection 49 and adjustably retained in position on said projection by lock nuts 50 with the lower end of said tubular portion arranged with a nozzle having a restricted outlet 51 to permit a limited amount of the adhesive to be deposited in a cap positioned by the feed rack in alignment with the outlet upon contact with said cap. The reservoir together with the outlet is reciprocated toward a cap on the rails 20, 21 during the period of rest of the caps on the rails and away from the caps during the travel of the caps by a slide 52 from one end of which the projection 49 extends slidably mounted in a slideway in a pillar 53 supported by the table T, the end of the slide opposite to the projection 49 being pivotally connected at 54 to a crank arm 55 having a strap 56 loosely encircling an eccentric 57 fixed on the drive shaft 14, Figure 3. To prevent the force of the contact of the nozzle outlet 51 with a cap on the rails 20, 21 forcing the cap from the rails, a post 58 is mounted in the table T to be engaged by and support the cap during the applying of the adhesive to the cap. It is to be understood that other methods of applying the adhesive to the caps may be employed without departing from the scope of the invention, such as, by feeding a web of adhesive material to a punch and die mechanism which will sever and apply a disk of such material to the cap, or the adhesive may be in the form of a coating on the material of the cap.

After the adhesive is applied to the caps they are transferred along the rails 20, 21 from the adhesive supplying device or means through a zone having an elevated temperature to heat and maintain the adhesive in a viscous state and evaporate the alcohol therefrom, said zone being created by a suitable heating device and shown as comprising gas burning means embodying a pipe 59 adjustably mounted in superposed relation to the line of travel of the caps by arms 60 fixed at one end to the pipe and the opposite ends

pivotally mounted on the cap supporting rail 21, as at 61, to permit the adjustment of the burner away from the caps when the apparatus is not in operation to prevent the scorching of the caps and operative parts of the apparatus. The pipe 59 is arranged with a series of burner orifices 62 adapted to be opposed to the caps when the pipe is adjusted to juxtaposed position relative to the caps and direct the gas flame toward the caps. The gas is delivered to the pipe 59 from a source of supply by the usual flexible hose, not shown, connected to a nipple 63 extended laterally from the pipe 59.

From the zone of elevated temperature the caps having the viscous adhesive therein are positioned by the feed rack relative to means or devices for delivering and positioning sealing pads or disks P composed of comminuted or solid cork in the caps in contact with the adhesive, said sealing pad positioning means comprising a plunger 64 having a screw threaded end portion loosely engaged in an opening in a projection 65 extending laterally of a slide 66, the plunger being retained in adjusted positions by lock nuts 67 threaded on the screw threaded portion engaging the opposite faces of the projection. The slide 66 is slidably mounted in a slideway in a pillar 68 supported on the table T in alignment with the adhesive applying device carrying pillar 53 and the slide is reciprocated in a vertical direction to move the plunger 64 toward and away from the caps on the supporting rails from the drive shaft 14 by a crank arm 69 having a strap 70 at one end loosely encircling an eccentric 71 fixed on the drive shaft 14 and the opposite end of the crank arm pivotally connected to the slide 66, as shown at 72 in Figure 4. The sealing pads P are carried in stack formation in a magazine in the form of a tube 73 fixed in and extended upwardly from a block 74 having an opening 75 therethrough in alignment with the sealing pad positioning plunger 64 to serve as a guide for said plunger, said block 74 being mounted on another block 76 arranged with a slideway for an ejector slide 77 and in which slideway the stacked pads are supported in the normal inoperative position of the slide. The lowermost pad resting on the slideway and projected from the tube 73 is moved by the slide 77 along the slideway to an opening 78 through the block 76 in alignment with the opening 75 to permit the plunger 64 to engage and position such pad into a cap positioned by the feed rack in alignment with the openings 75, 78. The ejector slide 77 is reciprocated toward and away from the cap on the supporting rails 20, 21 and the pillar 68 to deliver a sealing pad to the plunger 64 by an actuator slide movable relative to the slideway in block 76 and normally disconnected from the ejector slide 77 by a latch 79 (Figure 2) pivotally carried by the ejector slide 77 and normally urged out of engagement with the actuator slide by a plate 80 engaging and lifting a projection 81 extending laterally from the latch 79 by a lever 82 pivotally mounted intermediate its ends on the side of block 76, as at 83, having one end 84 weighted to intersect the path of movement of the caps and move the opposite end thereof in an upward direction into engagement with a projection 85 extending from plate 80 and lifting the latch out of engagement with the actuator slide. Latch 79 is permitted to connect the actuator slide with slide 77, by a cap prior to its being positioned relative to plunger 64 engaging and lifting the lever end 84 which will move the opposite lever end from the projection 81 and permit the latch to engage the actuator slide by gravity and connect said slide with slide 76. The actuator slide is positively reciprocated by a lever 86 pivotally mounted on a bracket 87 extending downwardly from the block 76 with one end of the lever bifurcated and the bifurcation loosely engaging a pin fixed in the actuator slide, as shown in dotted lines at 88 in Figure 4, the opposite end of the lever being adjustably connected to one end of a rod 89 having the opposite end connected to a strap 90 loosely encircling an eccentric 91 fixed on the drive shaft 14. During the positioning of a sealing pad in a closure cap in contact with the viscous adhesive the closure cap is supported by a post 92 similar to post 58 secured at one end in the table T and the opposite end engaged by the cap to prevent the cap from being forced by the plunger 64 between the rails 20, 21.

After the sealing pads have been positioned in the caps, the caps are positioned relative to means or devices to apply pressure to the sealing pads to intimately adhere the pads to the caps and simultaneously heat the pads preparatory to the adhesively securing of lining spots or disks D thereto. This means comprises a series of tubular plungers 93, five in number in the present instance, each having an annular enlargement or shoulder 94 adjacent one end, the plungers being arranged in alignment with the travel of the caps on the supporting rails 20, 21 and slidably mounted in openings in an arm 95 extended laterally from one side of a head 96 projecting laterally from a slide 97 slidably mounted centrally in another slide

98 slidable in a slideway in a standard or pillar 99 supported on the table T. The shoulders 94 yieldingly engage the upper surface of the arm 95 by springs 100 coiled about the plungers and confined between the arm 95 and a collar 101 fixed to each plunger adjacent the ends of the plungers opposite the ends having the shoulders 94, and urging the plungers to predetermined position as clearly shown in Figure 8, so that when the plungers are engaged with the sealing pads in the caps the slide 97 is adapted to be moved downward an added increment of movement beyond that necessary to engage the plungers with the sealing pads for a purpose hereinafter described the plungers during such movement of the slide 97 moving upwardly in the arm 95 against the tension of the springs 100 thereby imparting a yielding force on the sealing pads and evenly adhering the pads to the caps without forcing the caps pass the supporting rails, as shown in Figure 9. To heat the plungers an electric heating unit 102 of conventional form is arranged in each plunger supported by a screw threaded plug 103 in the outer end of the plungers with electric conductors 104 connected to the heating unit and extended through a plug of insulating material in the opposite end of the plungers, Figure 8, and a cap member 105 to a source of electricity, the cap member being in the form of a hand grip to facilitate the manual moving of the plungers against the tension of the springs 100 and being releasably mounted on the end of the plungers as by screw threading, as shown at 106^1 in Figures 8 and 9. The heat generated by the heating units 102 is transmitted to the sealing pads through the plugs 103 which are arranged with a broad contacting surface to engage centrally of the pads in the caps. A plurality of heated plungers 93 are provided, five in number in the present instance, but which may be decreased or increased to meet certain requirements to assure an intimate adhesion between the pads and caps, and to heat the pads to a predetermined temperature.

From the heating plungers 93 the caps with heated pads therein are positioned relative to means for assembling a lining spot or disk D centrally on the heated pads, said means being in the form of punch and die mechanism adapted to sever or cut a lining spot or disk from a web W of suitable material such as tin or aluminum foil or paper having a varnish applied to one surface, the requirement of the material being that it is impervious to moisture and acid resistant or resistant to other deteriorating action of the contents of the receptacles to which the caps are to be applied, said material having an adhesive combined therewith on one surface normally non-viscous at ordinary or room temperature but adapted to be rendered viscous or tacky when subjected to an elevated temperature. The punch and die mechanism comprises a punch 106 adjustably mounted in the head 96 of slide 97 that carries the heated plungers 93 by screw threading one end of the punch into a bushing 107 mounted in an opening through the head 96 of greater diameter than the exterior diameter of the bushing, the bushing being held against movement longitudinally of the punch, but permitted with the punch to have slight material movement in the head opening by an annular flange 107^1 at the end of the bushing engaging upon the head, and a perforated cap 110^1 engaged over the bushing flange and retained to the head 96 by a bolt 96^1. The punch is adjusted by screwing it into and out of the bushing 107 and is retained in adjusted position by lock nut 110 threaded onto the screw threaded end of the punch projecting through the bushing, as clearly shown in Figures 6 and 7. The die comprises a tubular member 115 having an internal diameter to permit of the passage of the punch therethrough and having a rectangular flat portion 115^1 at one end extending at a right angle to and of a width greater than the diameter of the bore therethrough to serve as a support for the web at opposite sides of the die opening, and having ledges extended upward from opposite sides to constitute guides for the web, the edge at the juncture of the wall of the bore with the flat portion constituting the cutting edge with which the punch co-operates to sever a lining disk or spot from the web. The die is carried by a tubular member 114 having a rectangular flat portion 114^1 at one end extending at a right angle to the bore in said tubular member and arranged in opposed and spaced relation to the rectangular portion 115^1 of the die, and forming therewith a passageway for the web. The die carrier is adjustably mounted in an opening in a lateral extension 112 of the slide 98, the die carrier being retained in adjusted position by nuts 113 threaded thereon and abutting the opposite faces of the slide extension 112. The die carrier also serves as a guide for the punch and by the mounting of the punch in the head 96 of the slide 97 by the bushing 107 as described the punch is adapted to automatically align itself in the punch carrier and prevent the setting up of binding stresses during reciprocation of the

punch.

The die with the web of lining material extended thereover and the punch are simultaneously actuated toward a cap positioned on the cap supporting rails 20, 21 below the punch and die when the end of the tubular portion 115 of the die engages the peripheral portion of the heated pad in the cap, the punch severing a lining disk or spot from the web and positioning the severed disk on and with the adhesive surface in contact with the exposed heated surface of the sealing pad within the die. The engagement of the tubular die portion 115 with the cap pad centres the cap on its support relative to the die opening and punch assuring the positioning of a cut lining disk or spot centrally of a cap pad. After the lining spot has been engaged on the cap pad by the punch, the die is moved away from the heated pad with the punch impinging the severed disk or spot against the pad and stripping the same from the receding die, and after the die leaves the pad the punch is moved away from the pad, the severed disk remaining on the pad by being adhesively united with the pad through the rendering of the adhesive viscous by the heat of the pad and the pressure applied to the disk by the punch.

The punch and die are actuated from the drive shaft 14 by a crank arm 116 pivotally connected at one end to a portion 117 of the punch carrying slide 97 extending through an opening O in the table T, the opposite end being arranged with a strap 118 loosely encircling an eccentric disk 119 fixed on the shaft 14, the disk 119 having a central peripheral ridge to engage a corresponding channel in the strap 118, as at 132, to prevent lateral movement of the arm 116. Reciprocation is imparted to the die carrying slide 98 and die by a pair of eccentric rings 120 loosely mounted on hub 121 of and at opposite sides of the eccentric disk 119 and adjustably secured to said eccentric to rotate therewith by a bolt 122 passed through the rings and an elongated arcuate slot 123 in the eccentric disk 119 to permit angular adjustment of the rings relative to the disk and vary the movement of the die relative to the movement of the punch, the bolt being drawn up to retain the eccentrics in adjusted position by a nut engaged on one end extending beyond a ring as at 124. It is to be noted that the eccentricity of disk 119 is greater than that of the rings 120 whereby the length of movement of the punch is correspondingly greater than the length of movement of the die to cause the die to be moved out of engagement with the cap pad before the punch which will strip the severed spot from the die and adhere the spot to the pad. The eccentric rings 120 are connected to the die carrying slide 98 by a pair of arms 125 arranged at one end with straps 126 loosely encircling the rings, and retained on the rings against lateral displacement by annular flanges 127 projecting from the periphery of the rings, Figure 8, the opposite ends of the arms 125 being pivotally connected to a portion 128 extending from the die carrying slide 98 in a direction away from the portion 117 of slide 97, as clearly shown in Figures 6 and 7, and the arms maintained in spaced relation by a spacer in the form of a sleeve 129 engaged between the arms on a bolt 130 passed through and clamped to the arms, as shown in Figure 8. The cap having a severed disk or spot applied thereto is supported on the rails 20, 21 relative to the punch and die by a post 131 secured in the table T having a flat end engaged by and supporting the cap in the same manner as the posts 58 and 92 support the caps relative to the adhesive supplying means 47 and sealing pad applying plunger 64.

The reciprocatory movements of the slides 97, 98 imparted thereto by the eccentrics 119, 120 tends to wear the slideway in the standard 99 and to take up such wear shims 133 are engaged between the standard 99 and the slide 97, as shown in Figures 2, 6 and 7, and are retained in position relative to the slide 97 by set screws 134 threaded into the standard abutting the shims and maintained in adjusted position by lock nuts 135 on the screws bearing against the standard 99. It is to be noted that the adjustment of the slide 97 relative to the slideway will also adjust the slide 98 toward and away from the rear of the slideway. The slides 97, 98 and also slide 66 carrying plunger 64 to apply the sealing pads are adjusted toward and away from the sides of their respective slideways by shims 136 interposed between one side of each slideway and a side of the slides 66 and 98 and adjusted toward and away from said slides by set screws 137, as shown in Figure 2.

The web W of lining material is intermittently fed to the punch and die from a roll of such web, not shown, supported on the side of the standard 99 opposite to the slides 97, 98, and under a roller 138 mounted between a pair of vertical guide flanges 139 of a plate 140 supported on the standard 99 and extended through corresponding elongated openings 141, 142, 143 in standard 99 and slides 97 and 98, respectively, to permit the passage of the web to the punch and die in all the positions thereof. The web is moved

relative to the punch during the upward movement of the punch away from the die and simultaneously with the feeding of the caps along the rails 120, 121 by a pair of superposed rollers 144 fixed to rotatable shafts 145 and positively driven one from the other by meshing gears 146 fixed on the end of each shaft, the shafts being supported in the legs of a U shaped standard 147 mounted on the table T in alignment with the punch and die and having the upper portions of the legs bifurcated, as shown at 148 in Figure 5, to slidably support the shaft of the upper roller 144 and permit adjustment of said roller toward and away from the lower roller to engage the web W between the rollers. The rollers are rotated to feed the web by a gear 149 fixed on a shaft 150 rotatable in lateral extensions 151 of the standard 147 and frictionally held against movement by a split collar 152, the gear 149 meshing with the lower gear 146. The gear 149 is intermittently rotated by a ratchet wheel 153 fixed on the shaft 150 and intermittently rotated by a pawl 154 pivotally carried by a rocker, in the form of a plate 155 loosely mounted on the shaft 150 between the gear 149 and ratchet wheel 153, the pawl being urged into engagement with the ratchet wheel by a spring 156. The rocker plate is rocked or reciprocated by a link 157 pivotally connected to an extension of the plate and one arm of a lever 158 pivotally mounted intermediate its ends in a bifurcated bracket 159 fixed to and extending from the table T. The opposite arm of the lever is pivotally connected to a sleeve 160 adjustably mounted between a pair of lock nuts 161 on a rod 162 fixed to a strap 163 loosely encircling an eccentric 164 fixed on the drive shaft 14, rotation of said eccentric imparting reciprocatory movement to the rod 162 and through the lever and link connection thereof with the rocker plate actuating the rocker, and as the rocker is moved in one direction engaging the pawl with and rotating the ratchet wheel and thereby gear 149 and web feeding rollers a predetermined distance.

To prevent the feeding of the web W relative to the punch and die mechanism with a consequent waste thereof with no cap positioned on the supporting rails 20, 21 in register with the punch and die mechanism, means are provided to hold the pawl out of engagement with the ratchet wheel upon the actuation of the pawl carrying rocker and thereby prevent the rotation of the gears 149 and 146, said means comprising a lever 165, Figures 2 and 8, pivotally mounted intermediate its ends on the standard 147, as at 166, one end of the lever extending over the path of travel of the caps on the cap rails 20, 21 and being weighted, as at 167, to urge said end of the lever in a downward direction toward the cap supporting rails and moving the opposite end into engagement with a pin 168 extending laterally from the pawl 154 to move and maintain the pawl out of engagement with the ratchet wheel 153. As a cap is fed along the cap supporting rails it passes below the weighted end of the lever 165 moving said end of the lever upward and the end of the lever engaging the pawl pin 168 is lowered out of engagement with said pin to permit the pawl to engage by the force of spring 156 the ratchet wheel, and the transmission of the reciprocatory movement of the lever 158 to rotatory movement to the gears 149, 146 and thereby to the web feeding rollers to feed a predetermined length of web W to the punch and die mechanism.

To assure an intimate adhesion between the severed lining disks or spots D and sealing pads P the caps are advanced from the punch and die mechanism by the reciprocation of the feed rack 27 to means to subject the lining disks or spots assembled on the pads in the caps to heat and pressure. This means comprises a plurality of heated plungers 169 similar in structure to the plungers 93 for applying heat and pressure to the sealing pads and a detailed description of the construction of such plungers, therefore, is not deemed necessary. The plungers 169 are loosely mounted in openings in an arm 170 extended from the side of head 96 of the punch carrying slide 97 opposite to the arm 95 carrying plungers 93. It will readily be seen that upon the downward movement of the punch carrying slide 97 successive caps on the rails 20, 21, containing sealing pads and lining spots are simultaneously engaged by the heated plungers 93, 169, respectively, and a lining spot is severed from the web and positioned on a heated sealing pad in a closure cap positioned relative to the punch and die mechanism. In the present instance only two plungers 169 are disclosed but it is to be understood that the number of said plungers may be increased or decreased depending upon the material of the lining spots and the speed at which the apparatus is operated.

To maintain an intimate adhesion of the lining spots to the sealing pads and of the sealing pads to the caps, the caps are advanced to means to place them under pressure as they cool. This means comprises a disk or table 171, partly shown in Figure 2, fixed on a shaft 172 rotatably supported in table T and con-

tinuously rotated from the drive shaft 14 through a ring gear 173 fixed to the table 171 and meshing with a pinion 174 fixed to a shaft 175 rotatable in a bearing bracket 176 mounted on the side of the table T, the shaft 175 having a gear 177 thereon meshing with a pinion 178 fixed on a stub shaft 179 supported by the table T and a pinion 180 fixed on shaft 179 meshing with a pinion 181 fixed on the drive shaft. The upper surface of the table 171 is in a plane with the cap supporting rails 20, 21, and the caps having the sealing pads and lining spots are delivered from said rails to the table 171 by the feed rack 27. To place the sealing pads and lining spots in the caps on the table under pressure to maintain in intimate adhesion during the cooling of the caps, sealing pads and lining spots, a series of plungers 182, Figure 2a, is circumferentially spaced around the table, said plungers being slidably carried by a pair of superposed ring members 183, 184 fixed in spaced relation on the shaft 172 superposed to the table 171. The plungers 182 are urged into engagement with the table 171 by springs 185 coiled about the plungers with one end fixed to the plungers and the opposite end abutting against the upper ring member 183. The ratio of the gearing 173, 174, 177, 178, 180 and 181 is such so as to rotate the table a distance equal to the spacing of the plungers 182 upon each cap feeding movement of the cap feeding rack 27 and thus deliver caps from the supporting rails 20, 21 to the successive plungers 182. To release the plungers from the caps on the table 171 and permit the positioning of caps on the table 171 in interposed relation to the plungers, each plunger carries a roller on a stud fixed in the plunger above the ring member 183 to extend laterally of the periphery of said ring member 183, as shown at 186, which rollers are adapted to ride up an arcuate cam member 187 supported upon the table T by the rotation of the plungers with the table 171, thus moving the plungers successively away from the table against the tension of the springs 185 and maintaining them in such position until they pass the delivery end of the rails 20, 21 and a cap has been delivered onto the table and positioned relative to a plunger when the plunger roller rides off the cam member 187 and the plunger engages a cap on the table 171 positioned relative thereto under the influence of its spring. As the plunger rollers 186 ride up the cam 187 and the plungers are moved out of engagement with the caps on the table 171 such caps by the rotation of the table engage an abutment 188 intersecting the path of travel of the caps, the abutment being arranged to direct the caps from the table 171 by the rotation of the table to a chute 189 leading from the apparatus.

The drive shaft 14 may be adjusted relative to the different operating means by a manipulating wheel 190 fixed to the end of the drive shaft opposite to the end having the pulleys 17, 18, as shown in Figure 1.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The assembling of sealing pads in closure caps and disks of facing material on the sealing pads, consisting in providing a closure cap having an adhesive therein, and in successive sequence heating the cap to render the adhesive tacky, depositing a sealing pad on the adhesive in the cap, subjecting the pad in the cap to heat and pressure to effect an intimate adhesion between the pad and cap and heat the exposed surface of the pad in the cap, place a facing disk of a non-absorbent, gas impervious and acid resisting material having an adhesive on one surface non-viscous at normal temperature and adapted to be rendered viscous when subjected to an elevated temperature on the heated sealing pad with the adhesive surface in contact therewith, the heat of the pad rendering the adhesive viscous and causing adhesion of the facing disk to the pad, and then placing the disk of facing material on the pad and the pad in the cap under pressure to intimately unite the facing disk to the pad and the pad to the cap.

2. Assembling sealing pads in receptacle closure caps and disk of facing material on the sealing pads as claimed in claim 1, wherein an adhesive is deposited in the cap prior to the heating of the cap and during the heating of the sealing pad it is placed under pressure to effect an intimate uniting of the pad to the cap.

3. Assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 1 or 2, wherein the disk of facing material after assembling on the pad is subjected in successive sequence to heat and pressure to effect an intimate uniting of the facing disk to the pad and the pad to the cap, and then placing the disk of facing material and pad under pressure during the cooling thereof.

4. Assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims

1, 2 or 3, wherein the disk of facing material is cut from a web and in successive sequence with the cutting of the disk from the web depositing said disk under pressure upon the heated sealing pad in the cap with the adhesive of the disk of facing material in contact with the pad.

5. In the assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads, apparatus embodying devices to which the caps are presented in continuing sequence operative to carry out the steps of claim 1 of depositing sealing pads in the caps provided with an adhesive, heating means relative to which the caps travel to render the adhesive tacky, means to heat and place the pads in the caps under pressure, place disks of facing material having an adhesive on one surface non-viscous at normal temperature and adapted to be rendered viscous when subjected to an elevated temperature on the sealing pads with the adhesive surface in contact with the heated pads to render the adhesive tacky and adhere the disks to the pads, and then placing the disks of facing material on the pads and the pads in the caps under pressure to intimately unite the pads to the caps and the facing disks to the pads.

6. In the assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads, apparatus in accordance with claim 5, a device operative to carry out the step of claim 2 of depositing adhesive in the caps prior to heating the caps and assembling the sealing pads therein.

7. In the assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 5 or 6, means to carry out the step of claim 2 of placing the pads in the caps under pressure simultaneously with the heating of the pads.

8. In the assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 5 to 7, punch and die mechanism 105, 115' operative to carry out the step of claim 4 of cutting disks of facing material from a web and the punch operative in successive sequence with the cutting of the disks from the web to deposit the disks under pressure upon the heated sealing pads in the caps with the adhesive surface of the disks in contact with the pads.

9. In the assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 5 to 8, wherein the means to place the facing disks assembled on the sealing pads simultaneously under heat and pressure to effect an intimate uniting of the facing disks to the pads and the pads to the caps comprises a heated plunger.

10. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 5 to 8, spaced parallel rails 20, 21 on which the caps are supported at opposite marginal portions of the skirt of the caps, and means operative to feed the caps in continuous succession along the supporting rails and position the caps relative to the means to carry out the steps of claims 1 to 4, a rotatable table 12 to receive caps from a hopper, and means to transfer the caps from said table to the supporting rails.

11. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 6, wherein the device to supply adhesive to the caps consists of an adhesive carrying reservoir 47 having a discharge nozzle 51 movable into and out of engagement with a cap positioned on the rails relative thereto adapted to receive adhesive from the reservoir and deposit the adhesive in the cap.

12. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 5, wherein the means for depositing sealing pads in the caps consists of a magazine 73 containing a stack of the sealing pads, means to deliver the lowermost pad from the stack relative to a plunger 64 reciprocatory toward and away from a cap positioned on the cap supporting rails relative thereto operative to insert the pad delivered thereto from the magazine into the cap.

13. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claims 5 and 9, wherein the means to heat the caps to render the adhesive in the caps tacky comprises a gas burner 59 adjustably supported to superpose the heating unit above and relative to the travel of the caps along the cap supporting rails and away from the caps on said rails.

14. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 7, wherein the means to heat the sealing pads and subject the pads to pressure comprises a series of heated plungers 93 relative to which the caps are successively positioned movable into and out of engagement with the pads assembled in the caps positioned relative thereto.

15. Apparatus for assembling sealing

pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 8, wherein the die has a tubular portion 115 adapted to engage and center the cap relative to the punch and guide the punch to position the cut disk centrally of the sealing pad and arranged to strip the web from the punch.

16. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 5, wherein the means for placing the facing disks assembled on the sealing pads simultaneously under heat and pressure comprises a second series of heated plungers 169.

17. In apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 5, means relative to which caps with facing disks assembled on the pads are positioned to place the same under pressure during the cooling thereof.

18. Apparatus for assembling sealing pads in receptacle closure caps and disks of facing material on the sealing pads as claimed in claim 17, wherein the means to place the facing disks and pads under pressure during the cooling thereof comprises a rotatable table carrying a circular row of plungers normally urged toward the table, means to raise and hold the plungers away from the table for a predetermined length of travel of the table, and the caps with the pads and facing disks assembled therein delivered from the cap supporting rails to said table in interposed relation to the raised plungers and adapted to be engaged by the plungers as they are urged toward the table.

19. The assembling of sealing pads in receptacle closure caps and disks of facing material on the sealing pads, substantially as described with reference to the accompanying drawings.

Dated this 1st day of January, 1934.

A. A. THORNTON,
Chartered Patent Agent,
7, Essex Street, Strand, London, W.C.2,
For the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

Fig. 1

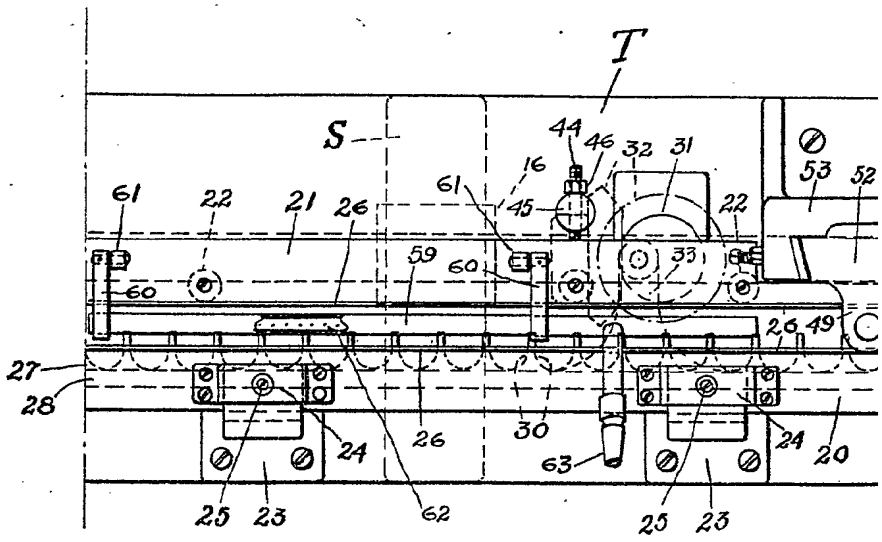


Fig. 2a

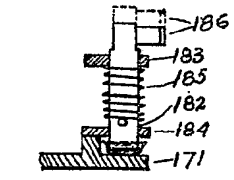


Fig. 2

. 1

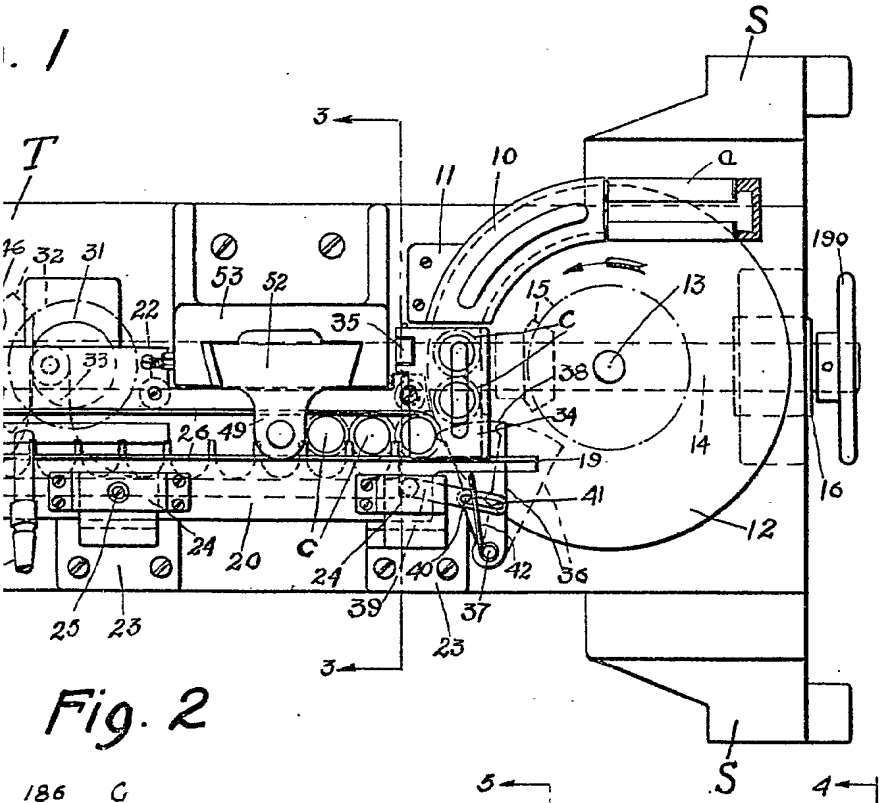
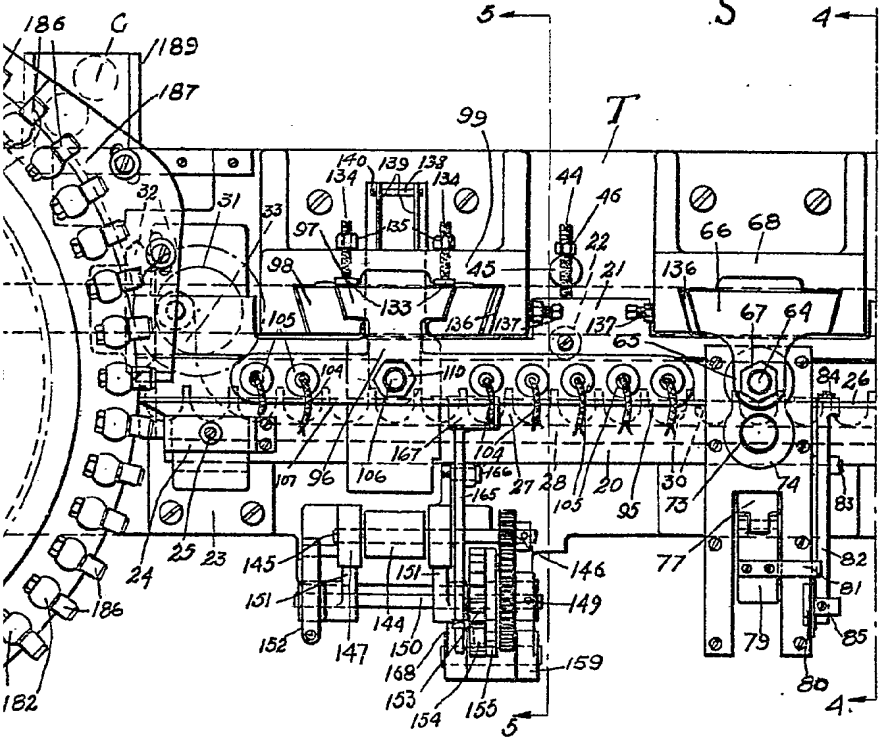


Fig. 2



. Malby & Sons, Photo-Lith.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

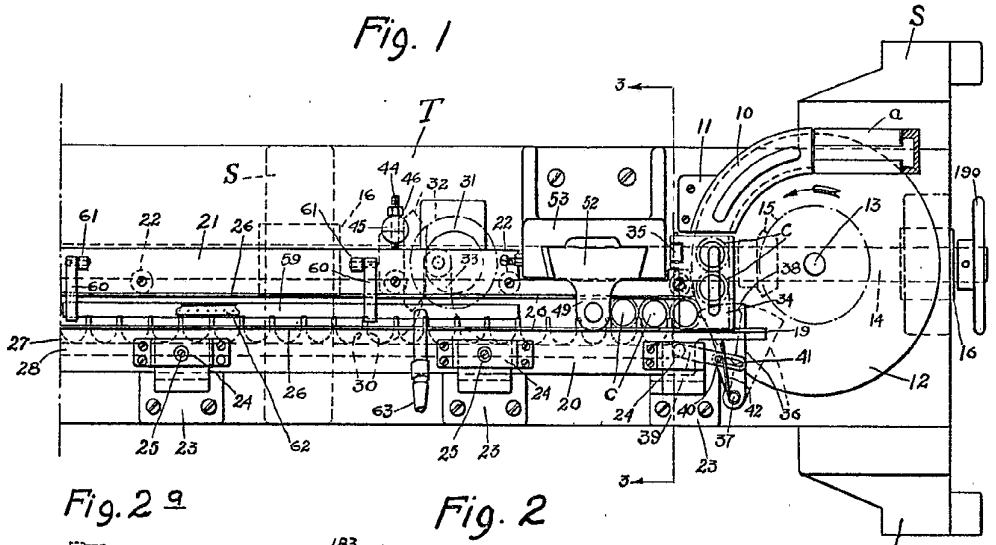


Fig. 2a

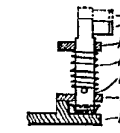


Fig. 2

. Malby & Sons, Photo-Lith.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 3

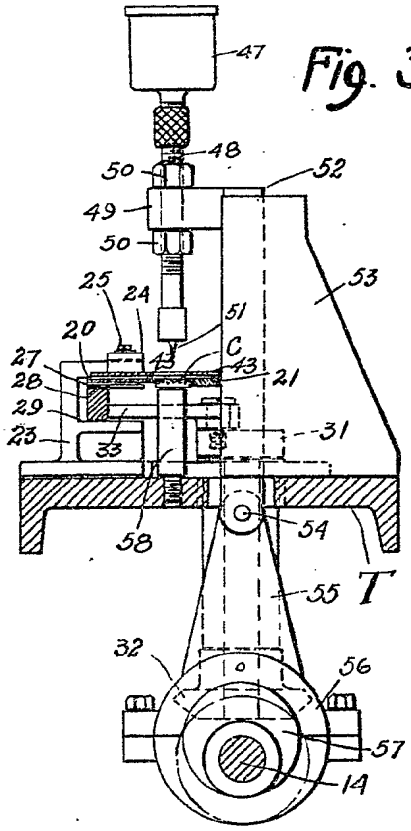


Fig. 4

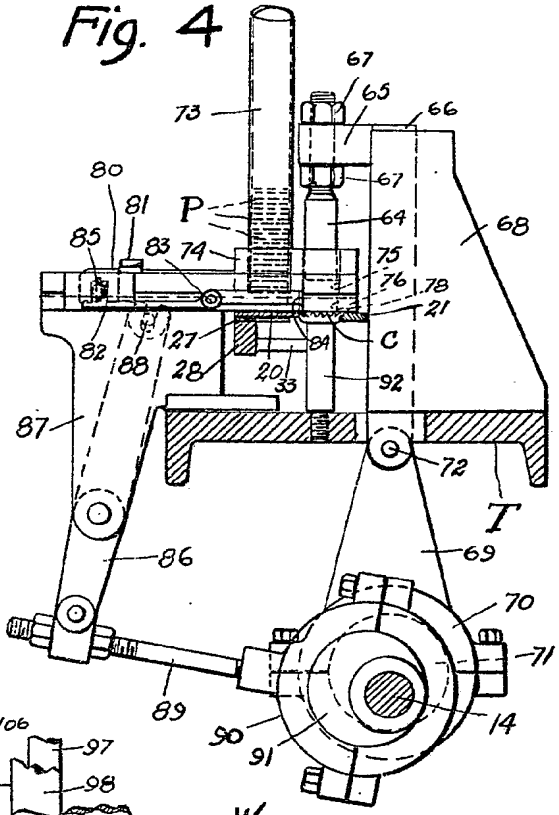
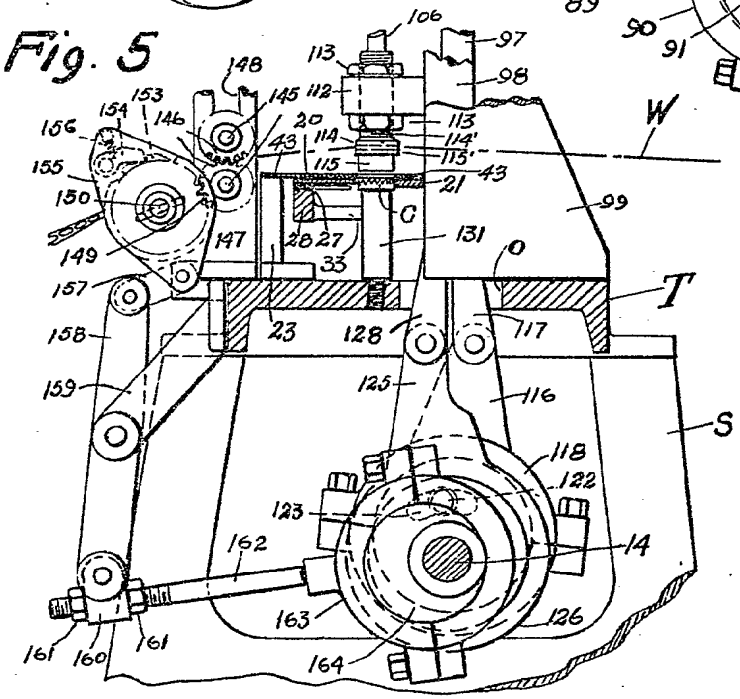


Fig. 5



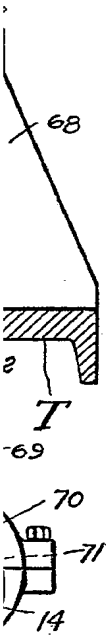


Fig. 6

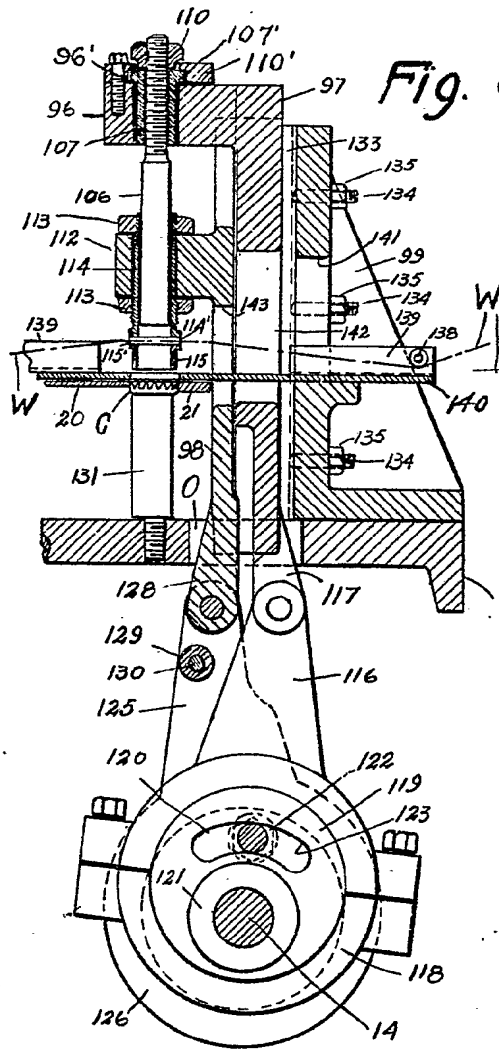
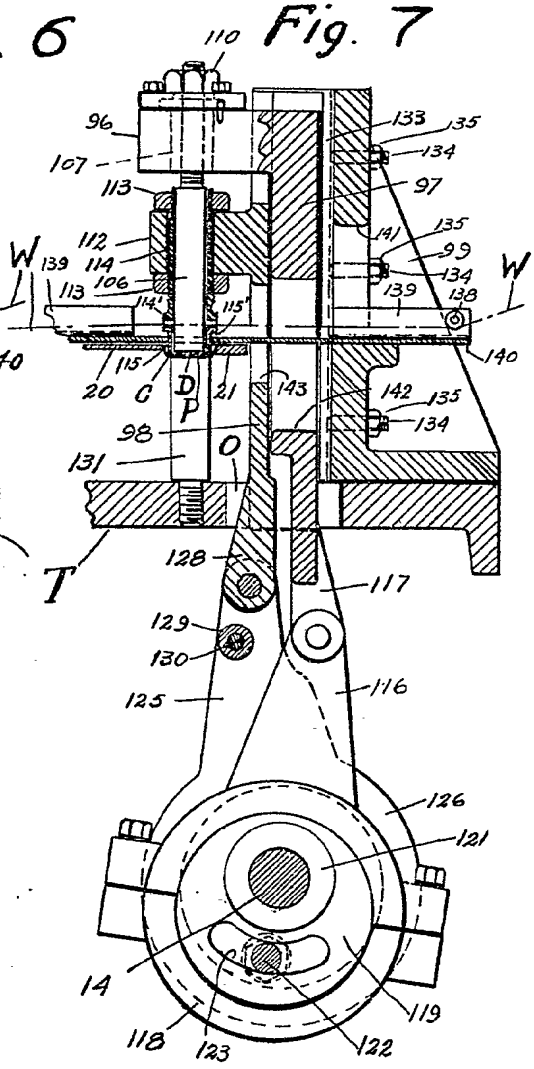


Fig. 7



Malby & Sons, Photo-Lith.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 3

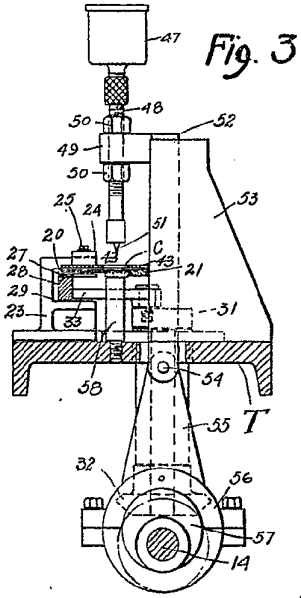


Fig. 4

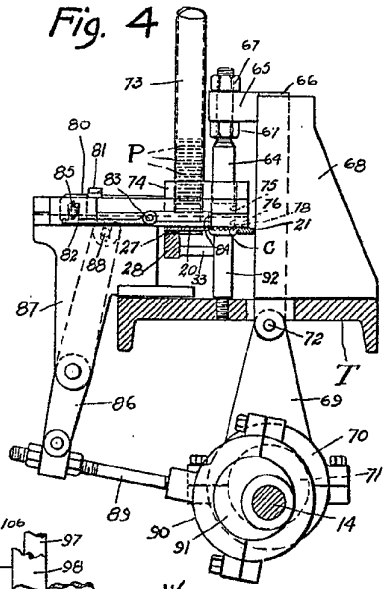


Fig. 5

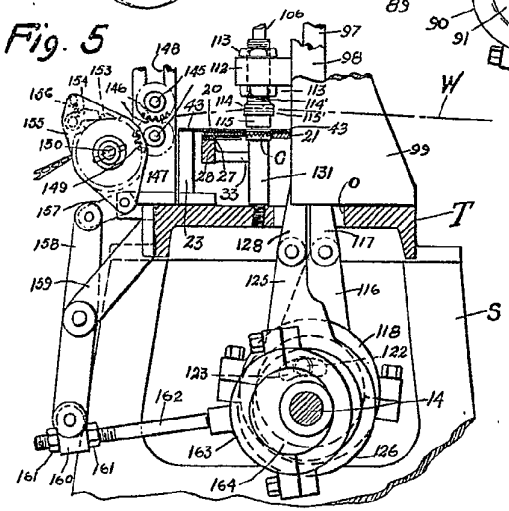


Fig. 6

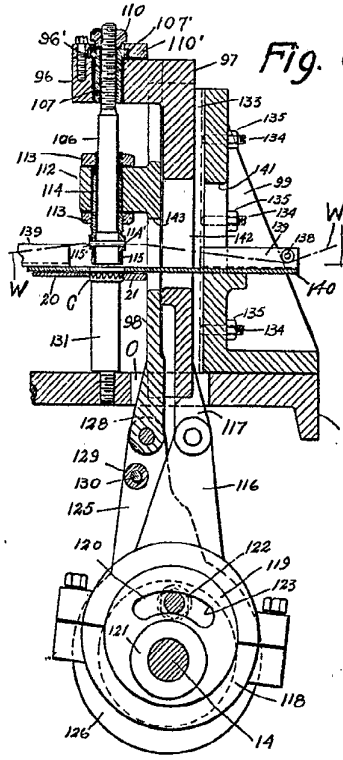
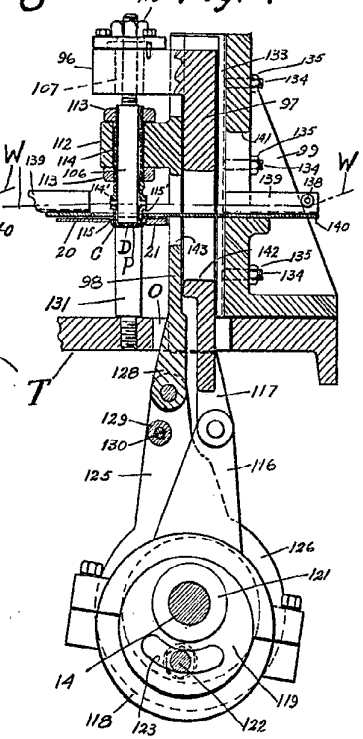


Fig. 7



Malby & Sons, Photo-Lith.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 8

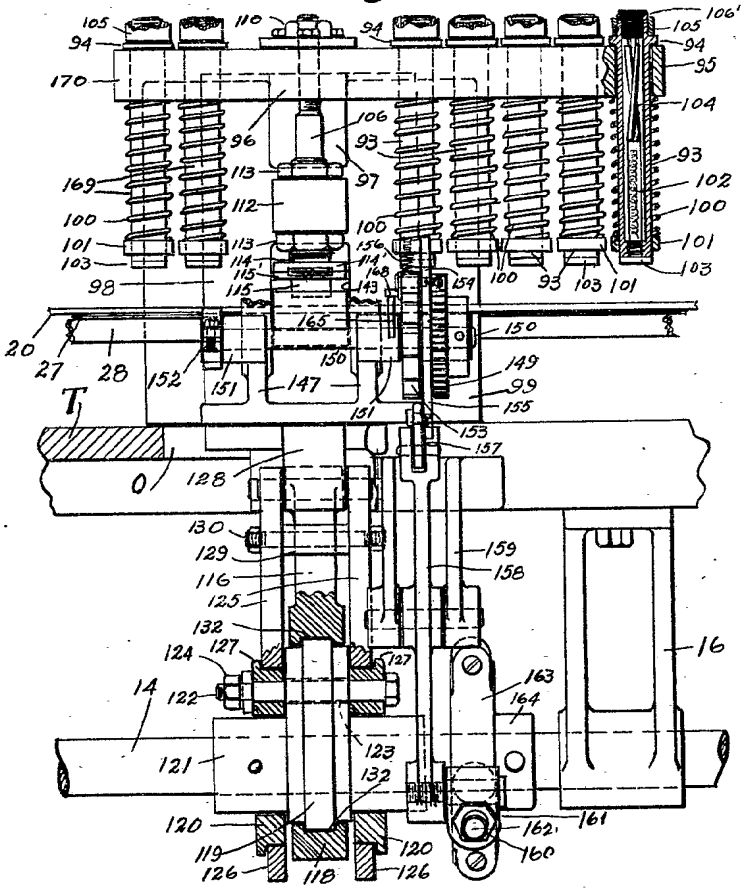
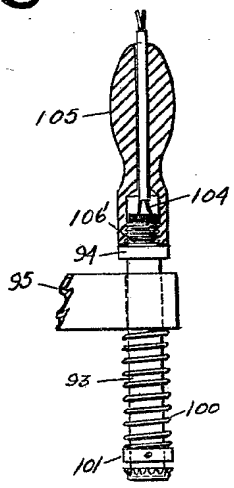


Fig. 9



Malby & Sons, Photo-Lith.